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FOLEY HOAG, LLP  
PATENT GROUP, WORLD TRADE CENTER WEST  
155 SEAPORT BLVD  
BOSTON, MA 02110

EXAMINER

BORIN, MICHAEL L

ART UNIT

PAPER NUMBER

1631

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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## Office Action Summary

### Application No.

09/671,817

### Applicant(s)

EDWARDS ET AL.

### Examiner

Michael Borin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) 4,6-37,44-66,70 and 71 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,38-43 and 67-69 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 1-71 are pending. Claims 4,6-37,44-57,65,66 have been withdrawn from consideration as drawn to non-elected species, and the remaining claims 1-3,5,38-43,58-64,67-71 were subject of restriction requirement.

In response to restriction requirement filed 01/02/2004, applicant elected, with traverse, Group IA, claims 1-3,5,38-43,67-69. Applicant argues that examination of Group IB will necessarily entails search of Group IA. However, restriction requirement is required to demonstrate one way distinctness between methods, and Examiner maintains that, as the methods have different functions and different effects, a reference teaching determining protein properties (e.g., determining correlation of protein's solubility and its utility as a drug target) will not teach or suggest optimizing expression of this protein. The restriction requirement is still deemed proper and is therefore made FINAL. Claims 58-64,70,71 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected groups.

Claims 1-3,5,38-43, 67-69 are under consideration. It is noted that the elected species of biophysical/biochemical properties is solubility.

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Rejections not reiterated from previous Office actions are hereby withdrawn. The following rejections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

***Claim Rejections - 35 USC § 112, second paragraph.***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-3,5,38-43,67-71 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The rejections are made for the following reasons:

A. The rejection made under 35 U.S.C. 112, second paragraph, in the previous Office action is maintained for the reasons set forth in the previous Office action which are re-iterated below, and is further augmented by additional considerations.

The stated objective of method of claim 1 is determination of properties of a protein. However, step a) of claim 1 already assumes that, for a given protein, this properties of a protein are already provided in a database. Hence, the question is, what remains to be determined?

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Applicant submits that the claim would be understood by one skilled in the art. Examiner agrees that while one skilled in the art will understand the terms used in claim, the meaning of the claims remains vague and ambiguous. Using the example of protein's solubility as the biophysical characteristic, reading of claim 1 will be understood as the following sequence of (simplified) events, and arise the following questions (addressed and highlighted in parentheses): In the database containing information on proteins and their properties, let's find a protein with solubility of, for example, 5mg/ml --> A protein is identified --> Now, knowing both solubility and sequence of the protein, let's analyze (**How?**) the sequence --> Further, knowing correlation between sequence and solubility of the protein, let's determine the solubility (**But that was the starting point of the search, don't we know it already??**).

Applicant refers to specification that discusses development of predictive rules relating protein's sequence to its biophysical "behavior". The instant claims, however, are not drawn to development of predictive rules, and remain ambiguous as illustrated above.

In addition, as part b) of claim 1 directs to correlating "one or more" parameters, the following questions arise: 1) If it is just one parameter, e.g., solubility, then the method step is reduced to recording the value of this single parameter - what it is to be correlated to? 2) If the two parameters to be "correlated" are a biophysical and

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biochemical properties, e.g., solubility vs utility as a drug target, how correlation of such two features can be used in “analyzing” sequence (which is the objective of the next method step)?

Further, the meaning, as well as metes and bounds of the term “analyzing” of the sequence is not clear. How the knowledge of a biophysical or biophysical property, e.g., solubility or utility as a drug target, assists in “analyzing” sequence of the protein? For example, how knowledge of amide hydrogen exchange, or conditions of crystallization, or behavior during mass spectrometry, is applied to analyzing protein sequence (wherein the latter is predetermined sequence of connected amino acid residues in a protein). Such knowledge does not seem to be helpful in clarifying sequence of connected amino acid residues in a protein. And, again, how is analyzing sequence using known functional properties of a protein will assist in determining same functional properties which are already known.

B. Claim 1 remains vague and indefinite in regard to the term “correlating”. Applicant states that the correlation (is) related to properties of the protein sequences in the database. This answer is not clear either. It remains unclear what actual method steps are involved in “correlating”.

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C. The first Office action rejected claim 1 stating that it is unclear whether the database includes one of many proteins. Applicant submits that the claim language is clear in that the database contains information on plurality of proteins. Consequently, is not clear whether the protein sequence, and protein properties which are correlated with the sequence belong to the same or different proteins. All that step b) requires is correlating sequence of a protein, with properties of another(?) protein, or correlating biochemical property of a protein and biophysical property of a[nother](?) protein? Clarification is requested.

3. Claims 1-3,5,68,69 are rejected under 35 U.S.C. 102(b) as anticipated by Payne et al. The rejection is maintained for the reasons of record and further in view of the following.

The instant claim are drawn to method of determining at least one biophysical and/or biochemical property of a protein comprising analyzing protein database containing sequence information as well as information on biophysical and/or biochemical properties, correlating sequence information and biophysical and/or biochemical properties, and thus determining at least one biophysical and/or biochemical property of a protein. One possible reading of the claim language is that

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it is drawn to "determination" of already known protein property (see rejection under 35 U.S.C. 112, second paragraph, above).

The Payne reference describes protein database wherein each yeast protein has an entry for protein sequence as well for its properties. Users can select (data mine) protein by name, sequence, or by any one or plurality of protein property categories (e.g., solubility). Opening of an entry for a given protein yields information correlating its sequence with its characteristics (e.g., biophysical characteristics). In addition, the database includes analysis tools for data mining in other sequence database.

It is the Examiners position that all the elements of Applicant's invention with respect to the specified claims are disclosed by the teaching of the reference cited above.

4. Claims 1-3,5,68,69 are rejected under 35 U.S.C. 102(b) as anticipated by Celis et al. (*FEBS Lett.* 430, 1-2, 64-72). Similarly to Payne reference, above, Celis et al teaches protein database wherein each protein has an entry for protein sequence as well for its properties as well as data mining tools (see Abstract, and pages 67-69).

5. Claims 1-3,5,68,69 are also rejected under 35 U.S.C. 103(a) as obvious over Payne et al or Celis et al. Because the claim language remains unclear (see rejection



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under 35 U.S.C. 112, second paragraph, above), Examiner assumes that the claims are directed not only to determining protein properties that are already known, but also to correlating protein sequence and properties that yet have not been correlated. The referenced database allows to do search (data mine) using as an entry either protein sequence or protein properties. Thus, it would be obvious to one skilled in the art that the database allows to correlate protein sequence with protein characteristics. One would be motivated to do so to identify, for example, properties of proteins having similar sequences, or, conversely, to identify proteins having similar properties. Furthermore, as the referenced database contains data analysis tools for data mining and is connected to other databases, one would be motivated to use data mining analysis to identify other similar proteins and/or their properties).

6. Claims 1-3,5,68,69 are rejected under 35 U.S.C. 102(b) as anticipated by Kim et al (IDS reference AE). As in the previous rejection, Examiner assumes that the claims are directed not only to determining protein properties that are already known, but also to correlating protein sequence and properties that yet have not been correlated.

Kim et al teach method of identification of novel proteins from databases by data mining using physico-chemical properties of proteins. A database is searched

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using amino-acid property index, such as solubility (see p. 769, last paragraph), sequences of interest are identified and correlated with the physico-chemical property.

7. Claims 39-43 are rejected under 35 U.S.C. 103(a) as obvious over Payne et al or Celis et al or King et al. The claims are drawn to particular data mining techniques. One would be motivated to use any well known and conventional data mining technique, and applicant presented ample demonstration that all of the claimed data mining techniques as well as selection of a particular method are well known in the art (see response filed 04/07/2003, pages 5-7). It would have been obvious to one skilled in the art to select an appropriate data mining method through routine experimentation.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Borin whose telephone number is (571) 272-0713. Dr. Borin can normally be reached between the hours of 8:30 A.M. to 5:00 P.M. EST Monday to Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Michael Woodward, can be reached on (571) 272-0722.

Any inquiry of a general nature or relating the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-0549.

04/02/04

MICHAEL BORIN, PH.D  
PRIMARY EXAMINER

